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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,626	04/21/2004	Neelesh B. Mchta	MERL-1563	5827
22199 7590 09/19/2007 MITSUBISHI ELECTRIC RESEARCH LABORATORIES, INC. 201 BROADWAY 8TH FLOOR CAMBRIDGE, MA 02139			EXAMINER LAI, DANIEL	
			ART UNIT 2617	PAPER NUMBER
			MAIL DATE 09/19/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/828,626	Applicant(s) MEHTA ET AL.	
	Examiner Daniel Lai	Art Unit 2617	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

### **Response to Amendment**

Applicant's arguments filed 13, July 2007 have been fully considered but they are not persuasive.

The argued features, i.e., a method for transmitting an input stream of symbols in a multiple-input / multiple-output wireless communications system including M subgroups of transmitting antennas, comprising: selecting L subgroups of the M subgroups of antennas, where  $L < M$ ; demultiplexing the input stream into L substreams, there being one substream for each one of L selected subgroups of antennas; adaptively modulating and coding each of the L substreams to a maximum data rate while achieving a predetermined performance on an associated channel used to transmit the substream; and space-time transmit diversity encoding each of the L coded substreams into a set of output streams, there being one output stream in each set for each antenna of each one of the L subgroups of antennas, read upon Kuchi in view of Walton.

Kuchi discloses transmitting input symbol stream using a first set of antennas and a second set of antennas. Therefore, Kuchi discloses the limitation "method for transmitting an input stream of symbols in a wireless communications system including M subgroups of transmitting antennas". Kuchi discloses selecting a first set antennas to transmit an input symbol stream, then select a second set of antenna to transmit an offset of input symbol stream. Therefore, Kuchi discloses the limitation "selecting L subgroups of the M subgroups of antennas, where  $L < M$ ". Kuchi discloses splitting an input stream into two symbol streams, one for each

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offset of input streams. Therefore, Kuchi discloses the limitation “demultiplexing the input stream into L substreams, there being one substream for each one of L selected subgroups of antennas”. Kuchi discloses modulating substream with a data rate, but lacks a maximum data rate and was modified by Walton to avoid lower data rate which causes interference or corrupt data. Therefore, Kuchi in view of Walton disclose the limitation “adaptively modulating and coding each of the L substreams to a maximum data rate while achieving a predetermined performance on an associated channel used to transmit the substream”. Kuchi further discloses performing space time transmit diversity encoding to each of the coded input symbol stream for each of the offset of the input symbol stream. Therefore, Kuchi discloses the limitation “space-time transmit diversity encoding each of the L coded substreams into a set of output streams, there being one output stream in each set for each antenna of each one of the L subgroups of antennas”.

In response to the argument that “Kuchi alone or in combination with Walton cannot and does not teach the adaptive modulation and coding that depends on the number of substreams”, the Examiner respectfully disagrees because as discussed above, Kuchi discloses method of transmitting input symbol stream with multiple offsets. Therefore, coding and modulation depends on the number of offsets (i.e., the number L).

In response to the argument that “there is no motivation for combining Kuchi with Naden” because Kuchi has a constant number (two) of substreams, Examiner respectfully disagrees because Kuchi discloses using a third set of antennas and even more additional set of antennas (col. 2, lines 47-67).

In response to the argument that Kim does not teach the limitation “L is zero to increase an overall capacity of the system including a plurality of receivers, Examiner respectfully

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disagrees because Kim teaches “increasing reception interference of the reverse link in proportion to the number of the antennas”, i.e., more antenna being used causes more interference (and hence reduce system capacity).

As a result, the argued features are written such that they read up the cited references.

***Priority***

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 10/209,306, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. The limitation "selecting L subgroups of the M subgroups of antennas, where  $L < M$ " is not supported by the parent application filed. Therefore, the subject matters added in the current application are not entitled to the filing date of the earlier application

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchi et al. (US 6,542,556 B1, hereinafter Kuchi) in view of Walton et al. (US 2003/0235147 A1, hereinafter Walton).

Regarding claims 1 and 8, Kuchi discloses a method for transmitting an input stream of symbols in a wireless communications system including M subgroups of transmitting antennas (Abstract), comprising selecting L subgroups of the M subgroups of antenna, where  $L < M$  (see col. 2, line 47-60; col. 3, line 28-37; Fig. 5, where Kuchi discloses subgroups of antenna being used for transmission). Kuchi discloses demultiplexing the input stream into L substream, there being one substream for each one of L selected subgroups of antenna (col. 6, line 60-67). Kuchi

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discloses adaptively modulating and coding each of the L substreams to a data rate while achieving a predetermined performance on an associated channel used to transmit the substream (col. 2, line 20-30; col.6, line 48-55). Kuchi discloses STTD encoding each of the L coded substreams into a set of output streams, there being one output stream in each set for each antenna of each one of the L subgroups of antennas (col. 7, line 3-12). Kuchi lacks maximum data rate. In an analogous art, Walton suggests coding with maximum data rate (paragraph 51). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the method of transmission disclosed by Kuchi with a maximum data rate disclosed by Walton in order to avoid lower data rate which causes to interfere or corrupt data. Note that the recitation "multiple-input/ multiple-output) has not been given patentable weight because it has been held that a preamble is denied the effect of a limitation where the claim is drawn to a structure and the portion of the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951). Claim 8 discloses limitations of an apparatus associated with claim 1, which Kuchi and Walton inherently discloses.

Regarding claim 4, Kuchi further discloses the modulation and coding depends on the number of L of the substreams (col. 7, line 28-37).

Regarding claim 6, Kuchi and Walton disclose the limitations of claim 1 as applied above. Kuchi further discloses coding each substream (col. 2, line 47-63). Kuchi lacks interleaving each coded substream and symbol mapping each interleaved substream. Walton discloses coded data is interleaved and further modulated (i.e., symbol mapped) (paragraph 38). It would have been obvious to one having ordinary skill in the art at the time of the invention to



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modify the method for transmission disclosed by Kuchi with the coding technique disclosed by Walton such that reliability of data transmission can be improved.

Regarding claim 7, Kuchi and Walton disclose the limitations of claim 1 as applied above. Kuchi does not teach demultiplexing each output stream into a plurality demultiplexed output streams; multiplying each of the plurality of demultiplexed output streams by an orthogonal variable spreading factor; adding the demultiplexed output streams, for each output stream, after multiplication into a summed output stream corresponding to each output stream; and multiplying each summed output stream by a scrambling code. Walton discloses demultiplexing each output stream into a plurality demultiplexed output streams; multiplying each of the plurality of demultiplexed output streams by an orthogonal variable spreading factor; adding the demultiplexed output streams, for each output stream, after multiplication into a summed output stream corresponding to each output stream; and multiplying each summed output stream by a scrambling code (paragraphs 152-156; Fig. 11). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the method for transmission disclosed by Kuchi with the coding technique disclosed by Walton such that reliability of data transmission can be improved.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchi in view of Walton as applied to claim 1 above, and further in view of Naden et al. (US 7,184,703 B1, hereinafter Naden).

Regarding claims 2 and 3, Kuchi and Walton disclose the limitations of claim 1 as applied above. Kuchi further discloses selecting the L substreams according to the channel conditions (i.e., number of channels) (col. 7, line 28-45). The references lack providing SINR as

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feedback as indication for channel conditions. Naden discloses transmitting measurement of SINR feedback as indication for channel conditions (col. 10, line 2-23). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the method for transmission disclosed by Kuchi with the feedback of SINR disclosed by Naden such that the noise level can be minimized.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchi in view of Walton as applied to claim 1 above, and further in view of Kim (US 2003/0103474 A1).

Kuchi and Walton disclose the limitations of claim 1 as applied above. Kuchi does not disclose decreasing the number of antenna to increase system efficiency. In an analogous art, Kim discloses interference is proportional to number of antennas (paragraph 28). Therefore, reducing number of antenna or channel will reduce interference and increase efficiency. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the method for transmission disclosed by Kuchi to reduced the number of channels disclosed by Kim such that system efficiency can be increased.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Lai whose telephone number is (571) 270-1208. The examiner can normally be reached on Monday – Thursday, 9:00 a.m. – 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nick Corsaro can be reached on (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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